

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Bristow, et al.)
Serial No.: 10/805,760) Group Art Unit: 1791
Filed: March 22, 2004)
For: METHODS OF FORMING A LAYERED) Examiner: M. A. Huson
ARTICLE)

VIA ELECTRONIC FILING

Commissioner for Patents
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APPEAL BRIEF

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is SABIC Innovative Plastics IP B.V. who purchased this application from General Electric Company in August 2007, although the assignment has not yet been recorded.

II. RELATED APPEALS AND INTERFERENCES

A Notice of Appeal will be filed in commonly assigned U.S. Patent Application Serial No. 11/618,950, filed on January 2, 2007, and claiming priority hereto. There are no other related appeals or interferences known to Appellants, Appellants' legal representatives, or assignee that will directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF THE CLAIMS

Claims 2 – 16 and 18 – 23 are pending in the application.

Claims 2 – 16 and 18 – 23 stand finally rejected. No claims stand objected to or withdrawn and no claims are allowed. Claims 1 and 17 have been cancelled. Claims 2 – 16 and 18 – 23, as they currently stand, are set forth in Appendix A. Appellants hereby appeal the final rejection of Claims 2 – 16 and 18 – 23.

IV. STATUS OF THE AMENDMENTS

No amendments have been filed subsequent to the final rejection dated December 12, 2007. All prior amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 3 is directed to a method of forming a layered article (Page 1, ll. 25), that comprises thermoforming a substrate sheet to form a shaped substrate (Page 1, ll. 26), wherein the shaped substrate is a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the shaped substrate (Page 1, ll. 26-28), wherein the void content is greater than or equal to about 0.5 vol.%, based on the total volume of the shaped substrate (Page 6, ll. 14-15; ll. 18-19), pulling a vacuum through the shaped substrate (Page 1,

line 28 – Page 2, ll. 1), and pulling a film layer onto a surface of the shaped substrate to form the layered article (Page 2, ll. 1-2).

Claim 8 is directed to a method of forming a layered article (Page 1, ll. 25), that comprises thermoforming a substrate sheet to form a shaped substrate (Page 1, ll. 26), wherein the shaped substrate is a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the shaped substrate (Page 1, ll. 26-28), pulling a vacuum through the shaped substrate (Page 1, ll. 28 – Page 2, line 1), wherein the shaped substrate is an open-celled, fiber reinforced plastic material (Page 6, ll. 19-20), and pulling a film layer onto a surface of the shaped substrate to form the layered article (Page 2, ll. 1-2).

Claim 18 is directed to a method of forming a layered article (Page 1, ll. 25), that comprises heating a substrate sheet to a temperature sufficient to loft the fibers of the substrate sheet (Page 2, ll. 4-5), disposing the substrate sheet against a membrane assisted pressure box (Page 2, ll. 5-6), pushing the substrate sheet onto a mold to form a shaped substrate (Page 2, line 6), heating a film layer (Page 2, ll. 7), disposing the film layer adjacent to the shaped substrate (Page 2, ll. 7), pulling a vacuum through the shaped substrate (Page 2, ll. 7-8), and pulling the film layer against the shaped substrate to form the layered article (Page 2, ll. 8-9), wherein the shaped substrate is a fiber-reinforced plastic material having a void content of greater than or equal to about 5 vol.% based upon the total volume of the shaped substrate (Page 6, ll. 14-15; ll. 18-19).

Claim 21 is directed to a method of forming a layered article (Page 1, ll. 25), that comprises pulling a vacuum through a shaped substrate (Page 1, line 28 – Page 2, ll. 1), wherein the shaped substrate comprises a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the shaped substrate (Page 1, ll. 26-28), wherein the void content is about 10 vol.% to about 50 vol.% based on the total volume of the shaped substrate (Page 6, ll. 16-17), and pulling a film layer onto a surface of the shaped substrate to form the layered article (Page 2, ll. 1-2).

Claim 22 is directed to a method of forming a layered article (Page 1, ll. 25), that comprises thermoforming a substrate sheet to form a thermoformed substrate (Page 10, ll. 5-6), wherein the substrate sheet comprises a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the substrate (Page 1, ll. 26-28), cooling the thermoformed substrate to form a shaped substrate (Page 10, ll. 10-11), pulling a vacuum

through the shaped substrate (Page 1, ll. 28 – Page 2, ll. 1), and pulling a film layer onto a surface of the shaped substrate to form the layered article (Page 2, ll. 1-2).

Claim 23 is directed to a method of forming a layered article (Page 1, line 25), that comprises thermoforming a substrate sheet to form a shaped substrate (Page 10, ll. 5-6), wherein the substrate sheet comprises a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the substrate (Page 1, ll. 26-28), wherein thermoforming comprises heating the substrate sheet to a temperature sufficient to loft the fibers (Page 2, ll. 4-5), pulling a vacuum through the shaped substrate (Page 2, ll. 8-9), and pulling a film layer onto a surface of the shaped substrate to form the layered article (Page 2, ll. 9-10).

Claims 4 and 19 are directed to a void content of about 10 vol.% to about 50 vol.% (Page 6, ll. 16-17).

Claim 5 is directed to the void content is about 25 vol.% to about 50 vol.% (Page 6, ll. 17-18).

Claim 7 is directed to the shaped substrate being foraminated (Page 6, ll. 20).

Claim 14 is directed to the method further comprising heating the substrate to a temperature sufficient to loft the fibers (Page 11, ll. 14-16).

Claim 12 is directed to the substrate sheet being thermoformed with a membrane assisted vacuum pressure forming method with a plug-assist (Page 8, ll. 12-14).

Claim 20 is directed to disposing a tie-layer between the shaped substrate and the film layer (Page 18, ll. 13-14).

Claim 15 is directed to the temperature about 450°F (about 232°C) to about 700°F (about 371°C) (Page 11, ll. 16-17).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

- A. Whether Claim 23 is anticipated, under 35 U.S.C. § 102(b), by U.S. Patent No. 6,224,706 to Matich.**
- B. Whether Claims 2 – 11, 13, 14, 16, 21, and 22 are obvious, under 35 U.S.C. §103(a), over Matich in view of U.S. Patent No. 5,968,629 to Masui et al. (“Masui”).**
- C. Whether Claims 12 and 18 – 20 are obvious, under 35 U.S.C. § 103(a), over Matich in view of Masui, further in view of U.S. Patent No. 4,529,641 to Holtrop et al. (“Holtrop”).**

- D. Whether Claim 15 is obvious, under 35 U.S.C. § 103(a), over Matich in view of Masui and Holtrop, further in view of U.S. Patent No. 5,854,149 to Nagayama et al. (“Nagayama”).**
- E. Whether Claim 23 is obvious, under 35 U.S.C. § 103(a), over Matich.**

VII. ARGUMENT

A. CLAIM 23 IS NOVEL OVER MATICH.

Claim 23 is directed to a method of forming a layered article.

To anticipate a claim under 35 U.S.C. §102, a single source must contain all of the elements of the claim. *Lewmar Marine Inc. v. Barient, Inc.*, 827 F.2d 744, 747, 3 U.S.P.Q.2d 1766, 1768 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 1007 (1988).

Present Claim 23 recites a method of forming a layered article including:

- “thermoforming a substrate sheet to form a shaped substrate;”
- “the substrate sheet comprises a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the substrate;”
- “thermoforming comprises heating the substrate sheet to a temperature sufficient to loft the fibers;”
- “pulling a vacuum through the shaped substrate;” and
- “pulling a film layer onto a surface of the shaped substrate to form the layered article.”

Hence, Claim 23, which must be read as a whole, comprises heating a substrate to a particular temperature, (sufficient to loft the fibers) to form a shaped substrate, pulling a vacuum through the shaped substrate, and pulling a film layer onto the surface of the shaped substrate.

Matich at least fails to disclose using a fiber-reinforced plastic material of a specific void content. In fact, the Final Office Action dated December 12, 2007 (hereinafter “FOA 12/07”) admits that Matich fails to disclose using a fiber-reinforced plastic material of a specific void content as recited in Claim 23. (FOA 12/07, Page 3) Matich fails to disclose other elements of Claim 23, including failing to disclose heating a fiber-reinforced plastic material to a temperature sufficient to loft the fibers, failing to disclose pulling a vacuum through the fiber-reinforced plastic material that has been heated to a temperature sufficient to loft the fibers, and failing to disclose pulling a film layer onto a fiber-reinforced plastic material that has been heated to a

temperature sufficient to loft the fibers. Thus, Matich fails to disclose many elements of Claim 23.

Matich discloses that air is evacuated from between the sheet and the block as the layers are compressed together. (Col. 4, lines 24-25) FOA 12/07 alleges that Matich discusses a vacuum that is pulled through the substrate. (FOA 12/07, Page, 7) However, in the section relied upon by FOA 12/07, Matich merely discloses that an impermeable or permeable material can be used and that “if desired, a bonding agent such as heat or pressure sensitive adhesive, can be located between the material 4 and block 1 and/or between the material 4 and sheet 7.” (Col. 3, lines 28-40) Discussion of applying a bonding agent between the material and block or material and sheet is not a discussion of pulling a vacuum through a thermoformed, shaped, substrate. Appellants maintain their assertion that Matich does not discuss a vacuum pulled through the presently claimed shaped substrate in the section relied upon by FOA 12/07.

To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine v. Varient Inc.*, 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987). Moreover, “[t]he identical invention must be shown in as complete detail as is contained in the *** claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). As discussed above, Matich fails to disclose various elements of Claim 23. Several elements of Claim 23, when taken as a whole (as is required), are missing. Thus, Claim 23 is novel over Matich. Hence, since Matich at least fails to disclose a method of forming a layered article including “heating the substrate sheet to a temperature sufficient to loft the fibers”, “pulling a vacuum through the shaped substrate”, or “pulling a film layer onto a surface of the shaped substrate to form the layered article”, Matich fails to anticipate Claim 23. In view of the foregoing, it is urged that the Final Rejection of Claim 23 be overturned and the claim allowed. The final rejection is in error and should be reversed.

B. CLAIMS 2 – 11, 13, 14, 16, 21, and 22 ARE NON-OBVIOUS OVER MATICH IN VIEW OF MASUI.

FOA 12/07 alleges that Matich shows the process as claimed in Claims 3 and 21, but admits that Matich does not show using a fiber-reinforced plastic material of a specific void content. (FOA 12/07, Page 3) FOA 12/07 relies on Masui to allegedly disclose a fiber-reinforced plastic material and a method of forming. (FOA, Page 3) FOA 12/07 then contends it would

have been obvious to one skilled in the art to “use Masui’s fiber-reinforced plastic material as the substrate in Matich’s molding process in order to enhance the acoustic absorbing component of the final article.” (FOA 12/07, Page 3)

With respect to Claim 8, FOA 12/07 alleges that Matich shows the process as claimed, but admits that Matich does not disclose using an open celled fiber-reinforced plastic material. (FOA 12/07, Page 4) FOA 12/07 also alleges that Masui shows it is known to carry out a “method for forming a layered article, wherein the substrate is an open-celled fiber-reinforced plastic material,” by interpreting that “expanded” implies an open-celled structure. (FOA 12/07, Page 4) FOA 12/07 then contends it would have been obvious to one of ordinary skill in the art “to use Masui’s open-celled fiber-reinforced plastic material as the substrate in Matich’s molding process in order to enhance the acoustic absorbing component of the final article.” (FOA 12/07, Page 4)

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, or knowledge generally available in the art at the time of the invention, must provide some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). “A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). To find obviousness, the Examiner must “identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does.” *Id.*

Appellants respectfully submit that, contrary to the allegations in FOA 12/07, the process in the present claims and that in Matich are different. Appellants note that in Matich, (i) a vacuum is not pulled through the presently claimed shaped substrate; air is evacuated from between the sheet and the block as the layers are compressed together; (ii) there is no “thermoformed shaped substrate”, and actually, there is not even a “shaped substrate” until the entire stack of layers have been compressed and cooled, and (iii) nowhere does Matich pull a film layer onto the shaped substrate; all layers are present at the same time as they are being compressed together.

FOA 12/07 contends that Matich shows pulling a film layer onto the substrate because allegedly “even a flat substrate has a ‘shape.’” (FOA 12/07, Page 7) Appellants respectfully disagree. In Appellant’s independent Claims 3, 8, 22, and 23, the “shaped substrate” is defined as a substrate which has been thermoformed: “thermoforming a substrate sheet to form a shaped substrate”, while in Claim 18, the shaped substrate is formed by “pushing the substrate sheet onto a mold” (i.e., it is a substrate sheet until it has been pushed onto the mold to form the shaped substrate). It is clear throughout the present applications and claims that a “shaped substrate” is not merely a sheet or a film as is alleged in FOA 12/07. Matich do not pull a vacuum through a shaped substrate as is presently claimed. The FOA 12/07 interpretation of “shaped substrate” ignores clear elements of the present claims. Accordingly, since in Matich air is evacuated from between the sheet and the block as the layers are compressed together, a vacuum is not pulled through a shaped substrate as in the present application. As discussed above and clearly in view of the definition of “shape”, in Matich, there is no shaped substrate until the entire stack of layers have been compressed and cooled.

This is evident from the portion relied upon by FOA 12/07 (Appellants are assuming that when the FOA states “Column 15 – 30”, that what was meant was Col. 4, lines 15 – 30):

However, during the application of the pressure difference between the sheet 37 and the base plate 2 so as to evacuate the air from between the base plate 2 and the sheet 37, the block 31 conforms to the profile of the former 32.

(Col. 4, lines 21 – 25) Appellants submit that Matich does not show the process as claimed. Matich does not first form a shaped substrate, wherein the shaped substrate comprises a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the shaped substrate. (Claims 3 and 21) Matich does not pull “a vacuum through the shaped substrate” (Claims 3 and 21) or pull “a film layer onto a surface of the shaped substrate to form the layered article”. (Claims 3 and 21)

Ascertaining the differences between the prior art and the claims at issue requires interpreting the claim language, and considering both the invention and the prior art references as a whole. (MPEP §2141.02) Elements cannot be picked out of the claims or the references and then used in a different way than was claimed in the claims or disclosed in the reference. As is clear from the present claims, and is further supported by the present specification, Matich does

not form a shaped substrate as presently claimed and does not pull a vacuum through such shaped substrate or pull a film onto such shaped substrate.

Hence, Matich, even in view of Masui, fail to render obvious the present claims. It is noted that several elements of the present claims are missing, and, regardless, it is noted that even if the elements were not missing, “[a] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). To find obviousness, the Examiner must “identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does.” *Id.*

Appellants respectfully submit that Matich, alone, and in view of Masui, does not show, disclose, or suggest, the process as presently claimed.

Masui is relied on to allegedly disclose a fiber-reinforced plastic material. Masui is directed to an “acoustic absorbing component comprising a fiber-reinforced thermoplastic resin having a percentage of void being not less than 50 vol %”. (Abstract) Appellants respectfully submit Masui discloses that to enhance acoustic absorbing performance, it is necessary to have a fiber-reinforced plastic material with a void content of *not less than* 50 vol.%. Seemingly, the process of Matich, which compresses the layers, would destroy this void content. Hence, one of ordinary skill in the art would not be motivated or prompted to take the material of Masui and use it as the substrate in Matich’s molding process as contended in FOA 12/07, because Matich works to “evacuate the air from between the base plate 2 and the sheet 37.” (Col. 4, lines 23 – 24) In so doing, the material is compressed. FOA 12/07 fails to explain how a reference specifically disclosing “removal of the air” (Matich, Col. 3, line 12) would maintain a void content of “not less than 50%.” Also, it appears the acoustic absorbing properties of the material could be lost (e.g., if the material is compressed as is taught in Matich). Therefore, there is no motivation or prompting to take the material of Masui and use it in Matich’s molding process to enhance the acoustic absorbing component of the final article as suggested by FOA 12/07, since it renders the art unsatisfactory for its intended purpose. (MPEP § 2143.01)

Additionally, Appellants respectfully submit there was no motivation, prompting, or suggestion to combine the method in Matich’s patent with the fiber reinforced plastic material in Masui’s patent. Matich is concerned with structurally strong articles and is directed to a method of making layered structural articles using expanded polystyrene (Abstract), while Masui is

directed to an acoustic absorbing component. (Abstract) The material used in Matich is inherently weak and the method serves to create a structurally strong article (Abstract), while the starting material in Masui, a fiber-reinforced plastic, is designed for acoustical purposes. As a result, it would not be obvious (there is no motivation or prompting) to use the fiber-reinforced thermoplastic of Masui in combination with the method in Matich.

Regarding Claims 22 and 23, the present Claim 22 recites a method of forming a layered article comprising

- “thermoforming a substrate sheet to form a thermoformed substrate,”
- “the substrate sheet comprises a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the substrate,”
- “cooling the thermoformed substrate to form a shaped substrate,”
- “pulling a vacuum through the shaped substrate,” and
- “pulling a film layer onto a surface of the shaped substrate to form the layered article.”

(Claim 22) (It is noted that FOA 12/07 refers to Claim 23 with respect to the cooling step, but the Advisory Action dated February 11, 2008 states the rejection applies to Claim 22, as there is no cooling step recited in Claim 23.) It is alleged that Matich shows a cooling step after the substrate and film have been joined and the selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results. (FOA 12/07, Page 7) FOA 12/07 then concludes it would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to include an intermediate cooling step to avoid unwanted deformation of the substrate before attaching the film. (FOA 12/07, Page 7) Appellants respectfully disagree. This fails to explain how such a cooling step would be employed in Matich since both the substrate and film are heated and formed at the same time and no “unwanted deformation” is disclosed. Furthermore, there is no explanation how an intermediate cooling step would avoid the alleged unwanted deformation.

Matich discloses:

applying a fluid pressure differential between that side of said sheet remote from said stack and that side of said stack remote from said sheet, to compress the members of said stack and conform said sheet to the shape of said compressed stack and mutually engage said sheet and compressed stack, air initially trapped between said stack and sheet and within said stack passing through said stack”.

(Matich, Col. 1, lines 51 – 58) If, as suggested in FOA 12/07, an intermediate cooling step is employed, it is not clear that the compressed stack would form the desired shaped stack of Matich, it is also not clear how or if the sheet would/could later be applied, and it is not understood why Matich would be prompted to add such time and complexity to the process. Again, as discussed in detail above with regard to Claims 3, 21, and 23, Matich fails to disclose various elements of the claims, including “pulling a vacuum through the shaped substrate” and “pulling a film layer onto a surface of the shaped substrate to form the layered article.” Thus, Claim 22 is non-obvious.

Regarding Claims 4 and 5, it is alleged that “Masui shows that it is known to carry out a method wherein the void content is 50 vol.% (Column 2, lines 33 – 35)” (FOA 12/07, Page 3) However, Masui does not teach a void content of a shaped substrate that is used in a process wherein a vacuum is pulled through the substrate and a film is pulled onto the substrate. Picking and choosing elements of the prior art, out of context, does not render the claims obvious or provide motivation to put those elements together with another reference. Appellants do not claim to have invented a particular void content. Appellants claim a method of making a layered article including forming a shaped substrate comprising a specific void content pulling a vacuum through that substrate. Masui is improperly relied upon. Matich, even in view of Masui fail to teach such a method. No *prima facie* case of obviousness has been established.

Claim 7 recites that the “shaped substrate is foraminated”. FOA 12/07 alleges Masui shows it is known to carry out a method wherein the shaped substrate is foraminated interpreting that “expanded” implies a foamed structure and assuming it is functionally equivalent to a foraminated structure. (FOA 12/07, Page 3) FOA 12/07 then alleges it would have been obvious to “use Masui’s foraminated substrate as that during Matich’s molding process in order to enhance the acoustic absorbability of the final product.” (FOA 12/07, Pages 3- 4) Firstly, it is not explained: (1) how the “compression of the stack” will maintain the acoustic abilities of the material of Masui; or (2) if or how the substrate could be foraminated in the process of Matich.

Matich states:

to compress the members of said stack and conform said sheet to the shape of said compressed stack and mutually engage said sheet and compressed stack, air initially trapped between said stack and sheet and within said stack passing through said stack.”

(Matich, Col. 1, lines 54 – 58)

Additionally, Appellants also respectfully submit that they may be their own lexicographers. (MPEP §2111.01) Furthermore, claims must be read in light of the specification. (MPEP §2111) As such, “[w]here an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim.” *Toro Co. v. White Consolidated Industries Inc.*, 199 F.3d 1295, 1301 (Fed. Cir. 1999). Appellants disclose, “the term ‘foraminated’ is used throughout this disclosure merely for convenience to discuss systems having holes *other than those formed by a network of cells in fluid communication with each other.*” (Paragraph [0022], *emphasis added*) Thus, the foamed structure of Masui’s expanded resin is not equivalent to the presently claimed foraminated structure.

Furthermore, FOA 12/07 cites Column 5, lines 21-23 of Masui and states with respect to Claim 8, that “it is being interpreted that ‘expanded’ implies an open-celled structure.” (FOA 12/07, Page 4) With respect to Claim 7, FOA 12/07 cites Column 5, lines 21-22 of Masui and states “it is being interpreted that ‘expanded’ implies a foamed structure, which is functionally equivalent to a foraminated structure.” (FOA 12/07, Page 3) The specification discusses a difference between an open-celled structure and a foraminated structure in Paragraph [0022]. Accordingly, the term “expanded” as cited by the Final Office Action cannot imply both an open-celled structure and a foraminated structure as such an interpretation is internally contradictory.

Claim 14 recites, “heating the substrate to a temperature sufficient to loft the fibers.” FOA 12/07 contends that Matich discloses, “heating a substrate sheet to a temperature (Column 4, lines 27 – 30)”. (FOA 12/07, Page 5) However, what is disclosed is “[i]f necessary heat can be applied.” As recited in the specification, lofting the fibers includes “expanding in the z-direction when heated.” (Paragraph [0023]) Nothing in Matich or Masui discloses or suggests that the temperature used is such that will loft the fibers. Appellants respectfully submit that a *prima facie* case of obviousness has not been established as the references have been taken out of context, and not all claim elements have been disclosed.

FOA 12/07 also contends that

heating the sheet is the positively-claimed method step, while “[allowing] lofting of fibers” is only an intended use of the heating step, and therefore, not a positively recited method step.

(FOA 12/07, Page 5) Appellants respectfully disagree. Appellants aver that lofting the fibers specifies the degree of heating; e.g., the temperature to which the sheet must be heated, i.e. a temperature sufficient to loft the fibers. Hence, the claim element “sufficient to loft the fibers...” is not merely an “intended use of the heating step”; it is a positively claimed method element that must be given patentable weight.

Considering that there is no prompting to combine the process of Matich and the materials of Masui, and that several elements of the present claims are missing from the references, no *prima facie* case of obviousness has been established. Additionally, the dependent claims provide further patentable distinction. Since these references, alone and in combination, fail to disclose the elements of the present claims, they fail to render the present claims obvious. In view of the foregoing, it is urged that the Final Rejection of Claims 2 – 11, 13, 14, 16, 21, and 22 be overturned and the claims allowed. The final rejection is in error and should be reversed.

C. CLAIMS 12 AND 18 – 20 ARE NON-OBVIOUS OVER MATICH IN VIEW OF MASUI AND HOLTROP.

Regarding Claim 12, FOA 12/07 alleges that Matich shows the process as claimed but does not specifically show using plug-assist vacuum molding. (FOA 12/07, Page 5) FOA 12/07 further alleges that Holtrop shows a method wherein the substrate sheet is thermoformed with a membrane assisted vacuum pressure forming method with plug assist. (FOA 12/07, Page 5) FOA 12/07 then contends that it would have been *prima facie* obvious to use Holtrop’s plug assist vacuum molding as that of Matich’s vacuum molding process to facilitate the most efficient vacuum molding available. (FOA 12/07, Page 5) It is noted, however, there is no evidence that Holtrop’s plug assist vacuum molding is “the most efficient vacuum molding available”, that Holtrop’s plug assist vacuum molding would attain the same results desired by Matich, and hence, the basis of the alleged motivation is unsupported and non-existent.

Claim 12, which is dependent upon Claim 3, discloses that “the substrate sheet is thermoformed with a membrane assisted vacuum pressure forming method with a plug assist.” (Claim 12) Here, the FOA contends that Holtrop shows “a method wherein the substrate sheet is thermoformed with a membrane assisted vacuum pressure forming method with plug assist (Column 5, lines 3 – 5).” (FOA 12/07, Page 6)

However, Holtrop merely discloses

In some instances it is also advantageous to apply vacuum to the mold cavities to assist in expanding non-adhered sections of the foamed thermoplastic.

(Col. 5, lines 3 – 5) Holtrop does not disclose that Holtrop’s plug assist vacuum molding is “the most efficient vacuum molding available”.

Additionally, Appellants note that Matich states: “this is similar to vacuum forming but is significantly different” (Col. 3, lines 1 – 2) In other words, they have considered vacuum forming and have chosen and a process that “is significantly different”. Hence, there is no motivation or prompting to replace the process or a portion thereof, of Matich with a vacuum forming process. It is also noted that Holtrop is completely silent with regard to a plug assist in the section relied upon in FOA 12/07. For at least these reasons, the combination is not proper. Furthermore, as noted above, Matich does not have a shaped substrate at the time that a vacuum is pulled.

Regarding Claims 18 – 20, FOA 12/07 relies on Matich and Masui to allegedly disclose the process. (FOA 12/07, Pages 5-6) As previously discussed, Matich and Masui fail to disclose the claimed process and the claimed materials; moreover, the combination is not proper as it seemingly renders the product unsatisfactory for its intended purpose.

FOA 12/07 states

With respect to Claims 18-20, applicant contends that the office action does not explain how Holtrop shows the claims. This is not persuasive because Matich clearly shows these claims (as was written in the office action). These claims are dependent upon claim 12, and as a result appear in the section wherein claim 12 is rejected.

(FOA 12/07, page 8) FOA 12/07, however, states: “Claims 12, and 18 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matich and Masui, further in view of Holtrop et al. (U.S. Patent 4,529,641).” (FOA 12/07, page 5)

However, Claim 18 is not dependent upon Claim 12, it is independent, and Claims 19 and 20 depend from independent Claim 18.

Furthermore, page 2 of FOA 12/07 states: “Claims 2-11, 13, 14, 16, and 21, are rejected under 35 U.S.C. 103(a) as being unpatentable over Matich, in view of Masui et al. (U.S. Patent 5,968,629).” Hence, Claims 18-20 were not rejected over Matich in view of Masui, they were rejected over Matich and Masui in view of Holtrop but, allegedly,

that the office action does not explain how Holtrop shows the claims... is not persuasive because Matich clearly shows these claims (as was written in the office action).

(FOA 12/07, page 8)

As appears to be admitted in FOA 12/07 by the fact that Claims 18-20 were not rejected over Matich in view of Masui, Claims 18-20 are non-obvious in view of these references. Since there is no explanation as to why or how Holtrop remedies the deficiencies of Matich and Masui, and since, as discussed herein, Holtrop fails to remedy the deficiencies of these references, Claims 18-20 are novel and non-obvious over Matich and Masui, alone and in view of Holtrop. No *prima facie* case of obviousness has been established. It is further noted that these claims have already been found patentable over Holtrop; see the Final Office Action dated October 20, 2006 and the subsequent Notice of Allowance and Notice of Allowability dated January 29, 2007.

Since these references, alone and in combination fail to disclose the elements of the present claims, considering it is admitted that Matich in view of Masui fail to render these claims obvious, and considering that there is not even an explanation or allegation as to how Matich and Masui in view of Holtrop render these claims obvious, they fail to render the present claims obvious. In view of the foregoing, it is urged that the Final Rejection of Claims 12 and 18 – 20 be overturned and the claims allowed. The final rejection is in error and should be reversed.

D. CLAIM 15 IS NON-OBVIOUS OVER MATICH IN VIEW OF MASUI, HOLTROP, AND NAGAYAMA.

Claim 15, which ultimately depends from Claim 3, is rejected because Matich allegedly shows the process as claimed but not heating to a temperature of 232°C to 371°C, but Nagayama allegedly discloses, “it is known to carry out a method wherein the heating temperature is 250°C (Column 28, lines 57-66).” (FOA 12/07, Page 6) FOA 12/07 concludes it would have been *prima facie* obvious to one of ordinary skill in the art to use Nagayama’s processing temperature during Matich’s thermoforming process to properly process and form the specific molding material without overheating or underheating.

The alleged reasoning for the combination is based upon the presumption that Matich does not properly process the molding material. However, there is no motivation to make such

an assumption. There is no motivation or prompting to pick specific temperatures from Nagayama to include them in Matich. Additionally, and regardless, Nagayama fails to remedy the many deficiencies of Matich and Masui. Hence, these references, even combined, fail to render the present claims obvious.

Additionally, the Office Action improperly relies on Nagayama to disclose a process temperature used in making a “Paper-Made Stampable Sheet”. (Title) Applicants respectfully submit that in determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. MPEP § 2141.02, citing *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983) Besides the fact that the present claims have already been found allowable over this reference (see the Final Office Action dated October 20, 2006, and the subsequent Notice of Allowance and Notice of Allowability dated January 29, 2007), no motivation, prompting, or suggestion exists that would lead one skilled in the art to consider the processing temperature of a non-analogous art, and combine it in a vastly different process using a different material. Appellants submit that the only motivation, prompting, or suggestion, if any, comes from Appellants’ specification. Nagayama fails to remedy the multiple deficiencies of Matich, Masui, and Holtrop.

Hence, there is no prompting or motivation to combine the references as suggested in FOA 12/07, and, even combined, Nagayama fails to solve the numerous deficiencies of Matich, Masui, and Holtrop. Since these references, alone and in combination fail to disclose the elements of the present claims, they fail to render the present claims obvious. In view of the foregoing, it is urged that the Final Rejection of Claim 15 be overturned and the claims allowed. The final rejection is in error and should be reversed.

E. CLAIM 23 IS NON-OBVIOUS OVER MATICH.

Claim 23, which must be read as a whole, comprises heating a substrate to a particular temperature, (sufficient to loft the fibers) to form a shaped substrate, pulling a vacuum through the shaped substrate, and pulling a film layer onto the surface of the shaped substrate. Matich fails to disclose using a fiber-reinforced plastic material of a specific void content, a fact that FOA 12/07 admits. (FOA 12/07, Page 3)

Matich fails to disclose other elements of Claim 23 as is discussed in detail above with regard to the rejection of Claims 3 and 21, including failing to disclose heating a fiber-reinforced plastic material to a temperature sufficient to loft the fibers, failing to disclose pulling a vacuum through the shaped, fiber-reinforced, plastic material that has been heated to a temperature sufficient to loft the fibers, and failing to disclose pulling a film layer onto a fiber-reinforced plastic material that has been heated to a temperature sufficient to loft the fibers.

Matich discloses that air is evacuated from between the sheet and the block as the layers are compressed together. (Col. 4, lines 24-25) FOA 12/07 alleges that Matich discusses a vacuum that is pulled through the substrate. (FOA 12/07, Page, 7) However, in the section relied upon by FOA 12/07, Matich merely discloses that an impermeable or permeable material can be used and that “if desired, a bonding agent such as heat or pressure sensitive adhesive, can be located between the material 4 and block 1 and/or between the material 4 and sheet 7.” (Col. 3, lines 28-40) Contrary to that alleged in FOA 12/07, discussion of applying a bonding agent between the material and block or material and sheet is a not discussion of pulling a vacuum through the substrate. Appellants maintain their assertion that Matich does not discuss a vacuum pulled through the substrate in the section relied upon by FOA 12/07.

Several elements of Claim 23, when taken as a whole (as is required), are missing. Thus, Claim 23 is novel over Matich. Hence, since Matich at least fails to disclose a method of forming a layered article including “heating the substrate sheet to a temperature sufficient to loft the fibers”, “pulling a vacuum through the shaped substrate”, or “pulling a film layer onto a surface of the shaped substrate to form the layered article”, Claim 23 is non-obvious over Matich. In view of the foregoing, it is urged that the Final Rejection of Claim 23 be overturned and the claim allowed. The final rejection is in error and should be reversed.

In the event the Examiner has any queries regarding the submitted arguments, the undersigned respectfully requests the courtesy of a telephone conference to discuss any matters in need of attention.

If there are any additional charges with respect to this Appeal Brief, please charge them to Deposit Account No. 50-3622.

Respectfully submitted,

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VIII. APPENDIX A

2. (Previously Presented) The method of Claim 3, wherein the film layer further comprises a compatible layer.

3. (Previously Presented) A method of forming a layered article, the method comprising:

thermoforming a substrate sheet to form a shaped substrate, wherein the shaped substrate is a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the shaped substrate, wherein the void content is greater than or equal to about 5 vol.%, based on the total volume of the shaped substrate;

pulling a vacuum through the shaped substrate; and

pulling a film layer onto a surface of the shaped substrate to form the layered article.

4. (Original) The method of Claim 3, wherein the void content is about 10 vol.% to about 50 vol.%.

5. (Original) The method of Claim 4, wherein the void content is about 25 vol.% to about 50 vol.%.

6. (Previously Presented) The method of Claim 3, wherein the fibers have a fiber diameter of about 6 micrometers to about 25 micrometers, and a fiber length of about 2 millimeters to about 75 millimeters.

7. (Previously Presented) The method of Claim 3, wherein the shaped substrate is foraminated.

8. (Previously Presented) A method of forming a layered article, the method comprising:

thermoforming a substrate sheet to form a shaped substrate, wherein the shaped substrate is a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the shaped substrate;

pulling a vacuum through the shaped substrate, wherein the shaped substrate is an open-celled, fiber-reinforced plastic material; and

pulling a film layer onto a surface of the shaped substrate to form the layered article.

9. (Previously Presented) The method of Claim 8, wherein the substrate sheet comprises:

about 25 wt.% to about 75 wt.% plastic material;

about 25 wt.% to about 75 wt.% fibers; and

wherein weight percents are based on a total weight of the substrate sheet.

10. (Original) The method of Claim 9, wherein the substrate sheet comprises:

about 35 wt.% to about 65 wt.% plastic material; and

about 35 wt.% to about 65 wt.% fibers.

11. (Original) The method of Claim 9, wherein the plastic material is selected from the group consisting of polycarbonate, polyester, polyetherimide, polyphenylene ether, polystyrene, polyamide, and combinations comprising at least one of the foregoing.

12. (Previously Presented) The method of Claim 3, wherein the substrate sheet is thermoformed with a membrane assisted vacuum pressure forming method with a plug-assist.

13. (Previously Presented) The method of Claim 3, further comprising disposing a tie-layer between the shaped substrate and the film layer.

14. (Previously Presented) The method of Claim 3, wherein thermoforming the substrate sheet further comprises heating the substrate to a temperature sufficient to loft the fibers.

15. (Original) The method of Claim 14, wherein the temperature is about 450°F (about 232°C) to about 700°F (about 371°C).

16. (Previously Presented) The method of Claim 3, wherein the substrate sheet further comprises a non-woven scrim disposed on a surface of the substrate sheet.

18. (Previously Presented) A method of forming a layered article, the method comprising:

heating a substrate sheet to a temperature sufficient to loft the fibers of the substrate sheet;

disposing the substrate sheet against a membrane assisted pressure box;

pushing the substrate sheet onto a mold to form a shaped substrate;

heating a film layer;

disposing the film layer adjacent to the shaped substrate;

pulling a vacuum through the shaped substrate; and

pulling the film layer against the shaped substrate to form the layered article;

wherein the shaped substrate is a fiber-reinforced plastic material having a void content of greater than or equal to about 5 vol.%, based upon the total volume of the shaped substrate.

19. (Original) The method of Claim 18, wherein the void content is about 10 vol.% to about 50 vol.%.

20. (Previously Presented) The method of Claim 18, further comprising disposing a tie-layer between the shaped substrate and the film layer.

21. (Previously Presented) A method of forming a layered article, the method comprising:

pulling a vacuum through a shaped substrate, wherein the shaped substrate comprises a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the shaped substrate, wherein the void content is about 10 vol.% to about 50 vol.% based on the total volume of the shaped substrate; and

pulling a film layer onto a surface of the shaped substrate to form the layered article.

22. (Previously Presented) A method of forming a layered article, the method comprising:

thermoforming a substrate sheet to form a thermoformed substrate, wherein the substrate sheet comprises a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the substrate;

cooling the thermoformed substrate to form a shaped substrate,

pulling a vacuum through the shaped substrate; and

pulling a film layer onto a surface of the shaped substrate to form the layered article.

23. (Previously Presented) A method of forming a layered article, the method comprising:

thermoforming a substrate sheet to form a shaped substrate, wherein the substrate sheet comprises a fiber-reinforced plastic material having a void content sufficient to allow a vacuum to be applied through the substrate;

wherein thermoforming comprises heating the substrate sheet to a temperature sufficient to loft the fibers;

pulling a vacuum through the shaped substrate; and

pulling a film layer onto a surface of the shaped substrate to form the layered article.

IX. EVIDENCE APPENDIX

There is no evidence submitted pursuant to 37 C.F.R. §1.130, 37 C.F.R. §1.131, or 37 C.F.R. §1.132 or any other evidence entered by the Examiner and relied upon by the Appellant in this appeal, known to the Appellants, Appellants' legal representatives, or assignee.

[NONE]

X. RELATED PROCEEDING APPENDIX

A Notice of Appeal will be filed in commonly assigned U.S. Patent Application Serial No. 11/618,950, filed on January 2, 2007, and claiming priority hereto. There are no other related appeals or interferences known to Appellants, Appellants' legal representatives, or assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.